

REMARKS

The present application contains claims 1-5, 7-11, 13, 17-18 and 26-34. Claim 34 is new and is supported by the description for example on page 14, lines 1-2. Claims 6, 12, 14-16 and 19-25 were deleted.

Claims 1-5, 7-11 and 13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nguyen et al. (US 5,712,851) in view of Baker-Harvey (US 6,385,638). Applicants amended claim 1 in order to emphasize and clearly state the differences between the invention of the present application and the disclosures of Nguyen and Baker-Harvey.

Claim 1, as amended, requires scheduling a processor to handle data from at least one first and second channels, without interruption, once during first and second cycle times, defined by the respective input and output rates of the channels. This amendment emphasizes that which was already in the claim, that the channel cycles are fixed cycles defined by circumstances external to the scheduler and not average cycles. The amendment further requires specifically that the scheduling is for processing without interruption. Support for this further amendment was taken from claim 12, which was deleted.

In contrast, Nguyen's method uses average cycles and does not ensure that the processing is performed within fixed cycles. In one embodiment, Nguyen allows a few channels to appear in a single slot (Fig. 2B of Nguyen) although this delays the handling of following slots. In another embodiment, Nguyen keeps track of a remainder variable (26) in order to ensure that over the long term, the cell-to-cell spacing averages to the required spacing (Nguyen, col. 3, lines 38-48). Neither of these methods provides for processing in each respective fixed cycle.

The scheduling described in Baker-Harvey, is suggested to be used under the constraints of preemptability (Baker-Harvey, col. 6, lines 20-24). Baker-Harvey does not teach or suggest, and in fact teaches away from, scheduling a processor of the server to handle the accumulated data, without interruption, as required by claim 1.

Neither of Nguyen and Baker-Harvey suggests a method that fulfills both the requirement of scheduling without interruption and the requirement of fixed cycles. In the office action, the Examiner stated that it would be obvious to combine Nguyen and Baker-Harvey regarding the question of using a server versus other apparatus. The Examiner, however, did not suggest to combine the scheduling methods of Nguyen and Baker-Harvey. Applicants respectfully submit that the scheduling methods of Nguyen and Baker-Harvey are very different and that applicants do not know of any sensible way to combine these methods in a way which makes claim 1 obvious.

Furthermore, applicants respectfully submit that there is no suggestion to combine the scheduling methods of Nguyen and Baker-Harvey.

The dependent claims add further patentability over the art. Claim 2, for example, requires that the first cycle begins concurrently with a second cycle. As Nguyen does not explicitly define predetermined channel cycles and his cycles are defined by the actual processing applied to each channel, Nguyen's cycles do not begin concurrently. Column 2, lines 16-19, referred to by the Examiner do not relate to channel cycles.

Claim 4, for example, requires that scheduling the processor to handle the accumulated data comprises scheduling the processor, during the second cycle, to handle the accumulated data from substantially all the at least one second channels, before scheduling the processor to handle data from any other of the plurality of channels. Column 2, lines 22-24, referred to by the Examiner, refers to handling a single slot and not to channel cycles.

For brevity, especially in view of the amendment to claim 1, applicants did not proceed in discussing each of the dependent claims. The dependent claims are patentable at least because they depend on claim 1, which is believed to be allowable.

Claims 17-18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nguyen et al. (US 5,712,851) in view of Baker-Harvey (US 6,385,638). Applicants amended claim 17 in a manner similar to claim 1. Claim 17 is an apparatus claim generally corresponding to claim 1, and therefore is patentable for the same reasons as claim 1.

Claims 26-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nguyen et al. (US 5,712,851) in view of Baker-Harvey (US 6,385,638). Applicants amended claim 26 to emphasize that scheduling the handling of long cycle channels is performed after the short cycle channels are handled, in each short cycle.

Nowhere does Nguyen teach a method which includes scheduling all the short cycle channels and only then scheduling the processor to handle at least one long cycle channel if possible. Even if some theoretical scheduling pattern could be devised for Nguyen in which all the short cycle channels are handled before the long channel cycles, Nguyen does not teach or suggest performing the active act of "determining whether a current short cycle has elapsed after scheduling the processor to handle the data from all the short cycle channels". Therefore, claim 26 is not anticipated by Nguyen. Neither is the method of claim 26 obvious in view of Nguyen, as the method of Nguyen is totally different from that of claim 26. For example, the method of Nguyen does not choose the order of processing according to the cycle times of the channels.

Claims 31-33 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nguyen et al. (US 5,712,851) in view of Baker-Harvey (US 6,385,638). Applicants respectfully submit that the Examiner did not present a *prima-facie* case of obviousness with respect to claims 31-33, as at least one of the requirements of claims 31 is absent from both the references cited.

Claim 31 requires determining, for at least one of the connections, of a quality of service level and scheduling the processor to process the connections in an order determined responsive to the determined quality of service level.

Nguyen mentions (column 1, lines 26-31) the need to achieve specified QoS for each channel independent of other virtual channels. Similarly, column 2, lines 4-8, mentioned by the Examiner, only states that the method proposed by Nguyen is used in order to satisfy a specified QoS. Nguyen does not teach or suggest scheduling in an order determined responsive to the QoS, as required by claim 31.

The dependent claims add further patentability over the art. Dependent claim 32, for example, requires scheduling the processor to handle data from at least one first connection before handling data from at least one second connection having a lower quality of service level than the at least one first connection. Dependent claim 33 requires changing the order of scheduling responsive to a change in the quality of service level. Neither of these is taught or suggested by Nguyen. Column 1, lines 56-63, mentioned by the Examiner, relates to different QoS for different channels and not to changing the QoS. In any event that is no mention of ordering the channels according to their QoS.

Claim 6 was rejected under 35 U.S.C. §112, as narrative and indefinite. Claim 6 was formulated to emphasize that the term "at least one channel" may include a plurality of channels. Applicants do not understand what is wrong with this claim. However, in order to expedite the prosecution, and since it is clear that the term "at least one channel" includes a plurality of channels even without claim 6, applicants deleted claim 6. Claim 7 was therefore amended to depend on claim 1.

The drawings were objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the reference sign 84 not included in the description. Applicants note that the reference sign 84 appears in the description towards the end of the portion relating to Fig. 3, on page 10, line 9 and page 11, line 7. Therefore, applicants are of the opinion that the drawings comply with 37 CFR 1.84(p)(5). If this is not sufficient, applicants will comply to a request to add an additional mention of reference sign 84.

In the conclusion, the Examiner stated that it would have been obvious to schedule a processor to handle a plurality of channels in any order, for any number of times and at whatever rate. The Examiner further claims that these data are steps of merely reacting to a scheduling scheme not mentioned in the claims. Applicants have attempted in the above discussion to point out for each independent claim those acts which are unique to the claimed invention and are not suggested by the art of record (including all the art known to applicants and brought forth in an IDS). The fact that the scheduling method of Nguyen or of Baker-Harvey could by chance achieve scheduling in a same order as by the claimed invention, is of no consequences. The question that is at hand is does the art suggest actively performing acts as required by the claims in order to achieve the scheduling order of the invention. The answer to the best of applicants' knowledge, as discussed above is that the art does not suggest such scheduling methods.

In view of the above remarks, applicant submits that the claims are patentable over the prior art. Allowance of the application is respectfully awaited.

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Marked up copy of amended claims

1. (Amended) A method of scheduling the handling of data from a plurality of channels, comprising:

accumulating data from a plurality of channels by a remote access server, at respective predetermined input rates;

providing data of each of the plurality of channels, at respective predetermined output rates;

scheduling a processor of the server to handle the accumulated data from at least one first one of the channels, without interruption, once during a first cycle time, defined by the respective input and output rates of the first channels; and

scheduling the processor to handle the accumulated data from at least one second one of the channels, without interruption, once during a second cycle time different from the first cycle time, the second cycle time being defined by the respective input and output rates of the second channels.

7. (Amended) A method according to claim 16, wherein the scheduling comprises scheduling the processor to handle the accumulated data from at least one of the second channels at least twice before scheduling the processor to handle data from at least one of the first channels.

17. (Amended) A remote access server, comprising:

a plurality of channel drivers which accumulate data from respective channels, at respective predetermined input rates and provide data of each of the plurality of channels, at respective predetermined output rates;

a processor which handles the accumulated data; and

a scheduler which schedules the processor to handle accumulated data from a first channel once during a first cycle time, defined by the timing of the driver of the first channel, and data from a second channel once during a second cycle time different from the first cycle time, without interrupting the processor while it is processing data from a channel.

26. (Amended) A method of scheduling the handling of data, by a remote access server keeping track of a short cycle and a long cycle, from a plurality of channels including at least one short cycle channel and at least one long cycle channel, comprising:

accumulating data from the plurality of channels by the server;
scheduling a processor of the server to handle the accumulated data from all the short cycle channels;
determining whether a current short cycle has elapsed after scheduling the processor to handle the data from all the short cycle channels; and
scheduling the processor to handle the accumulated data from one of the at least one long cycle channel if the current short cycle did not elapse according to the determining, if there is a long cycle channel which was not scheduled yet during the current long cycle.